

CLAIMS

1. A residential backup power system connectable to a utility power source, an external controller, and a plurality of loads, the system comprising:
  - a residential generator;
  - a switch connected to the residential generator and connectable to the utility power source, the switch being adapted to controllably provide power received from one of the utility power source and the residential generator;
  - a plurality of remotely operated first-level circuit branches, each first-level circuit branch being connected to the switch to receive power from the switch and connectable to at least one load, each first-level circuit branch further including at least one remotely operated circuit breaker and having one of an open state and a closed state;
  - a remotely operated second-level circuit branch connected to the switch to receive power from the switch and connectable to at least one load, the second-level circuit branch including at least one remotely operated circuit breaker and having one of an open state and a closed state; and
  - a controller connected to the circuit breakers and the external controller, the controller being adapted to control the circuit breakers thereby controlling the states of the first- and second-level circuit branches, the controlling of the first- and second-level circuit branches including, after receiving power from the residential generator via the switch,
    - opening the second-level circuit branch;
    - closing at least one branch of the first-level circuit branches.
    - receiving an input from the external controller to close the second-level circuit branch;
    - after receiving the input,
      - opening at least one branch of the closed first-level circuit branches;
      - after opening at least one branch of the closed first-level circuit branches, closing the second-level circuit branch; and
      - after closing the second-level circuit branch, closing at least one branch of the opened first-level circuit branches.

2. A system as set forth in claim 1 wherein the input includes a voltage signal from the external controller.

3. A system as set forth in claim 1 wherein the external controller includes a thermostat and the input includes a voltage signal from the thermostat.
4. A system as set forth in claim 1 wherein opening at least one branch of the closed first-level circuit branches includes opening all of the first-level circuit branches.
5. A system as set forth in claim 1 wherein closing at least one branch of the first-level circuit branches includes
  - closing a first branch of the first-level circuit branches, and
  - sequentially closing a second branch of the first-level manage circuit branches.
6. A system as set forth in claim 5 wherein the system further includes a current sensor to sense a current provided by the residential generator and wherein closing at least one branch of the first-level branches further includes
  - prior to sequentially closing the second branch, sensing a current with the current sensor,
  - comparing the sensed current to a predetermined current, and
  - performing the sequentially closing step if the sensed current is less than the predetermined current.
7. A system as set forth in claim 6 wherein closing at least one branch of the first-level branches further includes
  - after sequentially closing the second branch, sensing a second current with the current sensor,
  - comparing the second sensed current to the predetermined current, and
  - opening the second branch if the second sensed current is greater than the predetermined current.

8. A system as set forth in claim 1 wherein closing at least one branch of the first-level branches includes

closing a first plurality of branches of the first-level circuit branches, and

sequentially closing a second plurality of branches of the first-level manage circuit branches.

9. A system as set forth in claim 8 wherein the system further includes a current sensor to sense a current provided by the residential generator and wherein closing at least one branch of the first-level branches further includes

prior to sequentially closing the second plurality of branches, sensing a current with the current sensor,

comparing the sensed current to a predetermined current, and

performing the sequentially closing step if the sensed current is less than the predetermined current.

10. A system as set forth in claim 9 wherein closing at least one branch of the first-level branches further includes

after the sequentially closing the second plurality of branches, sensing a second current with the current sensor,

determining if the second sensed current is less than the predetermined current, and

opening the second plurality of branches if the second sensed current is greater than the predetermined current.

11. A system as set forth in claim 1 wherein the plurality of remotely operated circuit branches are connectable to a plurality of loads and wherein the system further comprises:

at least one priority circuit branch connected to the switch to receive power provided by the switch and connectable to at least one priority load, the at least one priority circuit branch being adapted to continuously provide power received from the switch.

12. A system as set forth in claim 11 and further comprising:  
at least one non-priority circuit branch connectable to the utility power source to receive utility power from the utility power source and connectable to at least one non-priority load, the non-priority circuit branch being adapted to provide only utility power to the non-priority load.

13. A method of operating a power management system adapted to provide power from a primary power source and a secondary power source to a plurality of loads, the system including a plurality of remotely operated first-level circuit branches and a remotely operated second-level circuit branch, each of the first- and second-level circuit branches being in one of an open state or a closed state, the method comprising:

connecting the plurality of first-level circuit branches and the second-level circuit branch to the secondary power source;

opening the second-level circuit branch;

closing at least one branch of the first-level circuit branches.

receiving an input to close the second-level circuit branch;

after receiving the input,

opening at least one branch of the closed first-level circuit branches;

after opening at least one branch of the closed first-level circuit branches,  
closing the second-level circuit branch; and

after closing the second-level circuit branch, closing at least one branch of the opened first-level circuit branches.

14. A method as set forth in claim 13 wherein the input signal includes a voltage signal.

15. A method as set forth in claim 13 and further comprising:

after closing at least one branch of the first-level circuit branches, opening the second-level circuit branch; and

repeating the steps of receiving an input to close the second-level circuit branch,  
opening all the first-level circuit branches, closing the second-level circuit branch, and  
closing at least one branch of the first-level circuit branches.

16. A method as set forth in claim 13 wherein opening at least one branch of the closed first-level circuit branches includes opening all of the first-level circuit branches.

17. A method as set forth in claim 13 wherein the step of closing at least one branch of the first-level circuit branches includes

closing a first branch of the first-level circuit branches, and

sequentially closing a second branch of the first-level manage circuit branches.

18. A method as set forth in claim 17 wherein the step of closing at least one branch of the first-level circuit branches includes

    prior to the step of sequentially closing the second branch, sensing a current provided by the secondary power source,

    comparing the sensed current to a predetermined current, and

    performing the sequentially closing step if the sensed current is less than the predetermined current.

19. A method as set forth in claim 18 wherein the step of closing at least one branch of the first-level circuit branches includes

    after the sequentially closing step, sensing a second current provided by the secondary power source,

    comparing the sensed current to a predetermined current, and

    opening the second branch of the first-level manage circuit branches if the second sensed current is greater than the predetermined current.

20. A method as set forth in claim 13 wherein the step of closing at least one branch of the first-level circuit branches includes

    closing a first plurality of branches of the first-level circuit branches, and

    sequentially closing a second plurality of branches of the first-level manage circuit branches.

21. A method as set forth in claim 20 wherein the step of closing at least one branch of the first-level circuit branches includes

prior to the step of sequentially closing the second plurality of branches, sensing a current provided by the secondary power source,

comparing the sensed current to the predetermined current, and

performing the sequentially closing step if the sensed current is less than the predetermined current.

22. A method as set forth in claim 21 wherein the step of closing at least one branch of the first-level circuit branches includes

after the sequentially closing step, sensing a second current provided by the secondary power source,

comparing the second sensed current to the predetermined current, and

opening the second plurality of branches if the second sensed current is greater than the predetermined current.

23. A method as set forth in claim 13 and further comprising:

prior to the connecting step,

connecting the plurality of first-level circuit branches and the second-level circuit branch to the primary power source; and

disconnecting the plurality of first-level circuit branches and the second-level circuit branch to the primary power source, when the primary power source provides inadequate power.

24. A method as set forth in claim 13 wherein the primary power source includes a utility power source and the second power source includes a residential generator.

25. A residential backup power system connectable to a utility power source and a plurality of loads, the system comprising:

a residential generator;

a switch connected to the residential generator and connectable to the utility power source, the switch being adapted to controllably provide power received from one of the utility power source and the residential generator;

a plurality of remotely operated circuit branches connected to the switch to receive power from the switch and connectable to the plurality of loads, each circuit branch including at least one remotely operated circuit breaker and having one of an open state and a closed state; and

a controller connected to the circuit breakers, the controller being adapted to control the circuit breakers thereby controlling the states of the circuit branches, the controlling of the circuit branches including, after receiving power from the residential generator via the switch, sequentially closing at least two of the circuit branches.

26. A system as set forth in claim 25 wherein sequentially closing at least two of the circuit branches includes

closing a first branch of the circuit branches, and

sequentially closing a second branch of the manage circuit branches.

27. A system as set forth in claim 26 wherein the system further includes a current sensor to sense a current provided by the residential generator and wherein sequentially closing at least two of the circuit branches further includes

prior to sequentially closing the second branch, sensing a current with the current sensor,

comparing the sensed current to a predetermined current, and

performing the sequentially closing step if the sensed current is less than the predetermined current.

28. A system as set forth in claim 27 wherein sequentially closing at least two of the circuit branches further includes

after sequentially closing the second branch, sensing a second current provided by the secondary power source,

comparing the second sensed current to the predetermined current, and

opening the second branch if the second sensed current is greater than the predetermined current.

29. A system as set forth in claim 27 wherein the controller includes the current sensor.

30. A system as set forth in claim 25 wherein sequentially closing at least two of the circuit branches includes

closing a first plurality of branches of the circuit branches, and

sequentially closing a second plurality of branches of the manage circuit branches.

31. A system as set forth in claim 25 wherein the system further includes a current sensor to sense a current provided by the residential generator and wherein sequentially closing at least two of the circuit branches includes

prior to sequentially closing the second plurality of branches, sensing a current with the current sensor,

comparing the sensed current to a predetermined current, and

performing the sequentially closing step if the sensed current is less than the predetermined current.

32. A system as set forth in claim 31 wherein sequentially closing at least two of the circuit branches further includes

after sequentially closing the second plurality of branches, sensing a second current provided by the secondary power source,

comparing the second sensed current to the predetermined current, and

opening the second plurality of branches if the second sensed current is greater than the predetermined current.

33. A system as set forth in claim 25 wherein the plurality of remotely operated circuit branches are connectable to a plurality of loads and wherein the system further comprises:

at least one priority circuit branch connected to the switch to receive power from the switch and connectable to at least one priority load, the priority circuit branch being adapted to continuously provide power received from the switch.

34. A system as set forth in claim 33 and further comprising:

at least one non-priority circuit branch connectable to the utility power source to receive utility power from the utility power source and connectable to at least one non-priority load, the non-priority circuit branch being adapted to provide only utility power to the non-priority load.

35. A system as set forth in claim 25 wherein the system further comprises an external controller adapted to generate a call signal, wherein the circuit branches include a plurality of first-level circuit branches and a second-level circuit branch, wherein the controller is connected to the external controller and is adapted to receive the call signal, and wherein the controlling of the circuit branches further includes, after receiving power from the residential generator via the switch

opening the second-level circuit branch,

receiving the call signal,

after receiving the call signal,

opening all of the first-level circuit branches,

closing the second-level circuit branch after opening the first-level circuit branches, and

after closing the second-level circuit branch, closing at least one branch of the first-level circuit branches.

36. A system as set forth in claim 35 wherein the call signal includes a voltage signal from the external controller.

37. A system as set forth in claim 35 wherein the external controller includes a thermostat and the input includes a voltage signal from the thermostat.

38. A method of operating a power management system adapted to controllably provide power from a utility power source and a residential generator to a plurality of loads, the system including a plurality of remotely operated circuit branches, each of the circuit branches including at least one remotely operated circuit breaker and being in one of an open state or a closed state, the method comprising:

opening at least two circuit branches;  
after receiving power from the residential generator,  
closing a first opened circuit branch; and  
sequentially closing a second opened circuit branch.

39. A method as set forth in claim 38 wherein the opening step occurs after receiving power from the residential generator.

40. A method as set forth in claim 38 and further comprising:

prior to the sequentially closing step, sensing a current provided by the residential generator;  
comparing the sensed current to a predetermined current; and  
performing the sequentially closing step if the sensed current is less than the predetermined current.

41. A method as set forth in claim 40 and further comprising:

after sequentially closing the second branch, sensing a second current provided by the residential generator;  
comparing the second sensed current to the predetermined current; and  
sequentially closing a third opened circuit branch.

42. A method as set forth in claim 40 wherein opening at least two circuit branches includes opening at least four circuit branches,

wherein closing a first opened circuit branch includes closing a first plurality of opened circuit branches,

wherein sequentially closing a second opened manage circuit branch includes sequentially closing a second plurality of opened manage circuit branches.

43. A method as set forth in claim 30 and further comprising:
  - prior to sequentially closing a second plurality of opened manage circuit branches, sensing a current provided by the residential generator;
  - comparing the sensed current to a predetermined current; and
  - sequentially closing the second plurality of opened manage circuit branches if the sensed current is less than the predetermined current.